BY THE ORDER OF THE COMMANDER
HEADQUARTERS, 377TH AIR BASE WING (AFMC)
KIRTLAND AIR FORCE BASE,
NEW MEXICO 87117

KAFB INSTRUCTION 48-110

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Aerospace Medicine

SAMPLING, ANALYSIS AND MONITORING PLAN

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFI 48-119, *Medical Service Environmental Quality Programs,* 25 July 1994. It defines guidelines, responsibilities, procedures, and precautionary measures for environmental sampling, analyses, and monitoring of drinking water and environmental sources. It applies to all personnel and operations on Kirtland AFB.

1. Objective: The objective of the Base Sampling, Analysis and Monitoring (SAM) Program is to ensure the base remains in compliance with all Air Force, federal, state and local regulations as they pertain to the Base Environmental Protection Program. Also, a solid SAM program ensures Kirtland AFB remains a good steward of the environment and protects members from exposure to unnecessary environmental hazards.

2. Authorities/References: This base instruction implements the medical service environmental quality programs and requirements contained in:

2.1. AFI 48-119, *Medical Service Environmental Quality Programs,* 25 July 1994

2.2. AFI 32-7042, *Solid and Hazardous Waste Compliance,* 12 May 1994

2.3. AFOSH Std 48-8, *Controlling Exposures to Hazardous Materials,* 1 September 1997

2.4. AFOSH Std 48-14, *Swimming Pools, Spas and Hot Tubs, and Bathing Areas,* 1 April 1996

2.5. 40 CFR, *Environmental Protection*

2.6. Asbestos Management and Operations Plan, 377 ABW, Kirtland AFB, May 1999

2.7. Hazardous Waste Management Plan, 377 ABW, Kirtland AFB, January 1999

2.8. Lead-Based Paint (LBP) Management Plan, 377 ABW, Kirtland AFB, April 1999

2.9. Stormwater Pollution Prevention Plan, 377 ABW, Kirtland AFB, 28 June 1999

2.10. New Mexico Environment Department (NMED), Title 20, Chapter 7, Part 1, Drinking Water Regulations, January 1995

2.11. City of Albuquerque Public Works Department Sewer Use and Wastewater Control

Ordinance

2.12. Standard Methods for the Examination for Water and Wastewater, 17th edition, 1989

3. Responsibilities:

3.1. The 377th Air Base Wing (ABW) Commander for Kirtland AFB has the ultimate responsibility for the Base Environmental Protection Program.

3.2. The 377th Medical Group Commander will:

3.2.1. Ensure the base has safe, potable drinking water and information relating to this water supply is provided to appropriate state and federal regulators as required.

3.2.2. Provide environmental information associated with medical service responsibilities to the 377th Civil Engineer Squadron (CES) and to 377 ABW Environmental Management (EM) for reporting to state and federal regulators.

3.3. The 377th Aerospace Medicine Squadron Bioenvironmental Engineer will:

3.3.1. Monitor the base drinking water system in accordance with Safe Drinking Water Act and report sample results to New Mexico Environment Department (NMED), Child Development Center, 377 CES, and EM.

3.3.2. Promptly inform 377 CES/CC of potable water issues that could impact public health or result in noncompliance with environmental regulations.

3.3.3. Review environmental sample analysis results and provide inputs to 377 CES along with guidance on any sample results that do not meet state or federal standards.

3.4. The 377th Air Base Wing Environmental Management Director will:

3.4.1. Serve as the directorate focal point for environmental program efforts. The director is responsible for ensuring that daily operations meet Air Force, federal, state, and local regulatory requirements.

3.4.2. Plan, program, and prepare budget submissions for environmental compliance programs, conservation programs, pollution prevention programs and the environmental restoration account.

3.5. The 377th Civil Engineer Squadron Commander will:

3.5.1. Retain responsibility for ensuring the operation and maintenance of the potable drinking water system to ensure delivery of potable water to Kirtland AFB residents. The day-to-day operations and maintenance of the utility systems may be transferred through an appropriate contract vehicle.

3.5.2. Ensure that members of the water plant (377 CES/CEOUW) and utilities (377 CES/CEOID) flights are trained and funded to perform duties IAW this instruction.

4. Safe Drinking Water Act (SDWA):

4.1. Sampling:

4.1.1. Microbiological Contaminant Sampling: 377 AMDS/SGPB will collect bacteriological samples (presence/absence for total coliforms, with *E. Coli* confirmation) monthly from the base drinking water supply. AMDS/SGPB will perform chlorine and pH analysis on-site, and a state certified lab will accomplish total coliform analysis. Fluoride samples are collected from seven sites, including the child development centers. The 377 AMDS/SGPB laboratory will conduct the analysis.

4.1.2. 377 AMDS/SGPB will take drinking water samples once a month from the locations listed in table 4-1.

Table 4-1. Total Coliform Sample Locations.

BUILDING	FACILITY NAME	ANALYSIS
30116	MANZANO FIRE DEPARTMENT	Bacteriological, Chlorine, pH
1055	ANG DISPENSARY	Bacteriological, Chlorine, pH
22000	O'CLUB	Bacteriological, Chlorine, pH
3530	*KIRTLAND E SCHOOL*	Bacteriological, Chlorine, pH, Fluoride
20160	*EAST CDC*	Bacteriological, Chlorine, pH, Fluoride
25543	1778 PERIMETER CIRCLE	Bacteriological, Chlorine, pH
20234	*EAST YOUTH CENTER*	Bacteriological, Chlorine, pH, Fluoride
25265	7312 HIRSCH AVE (ZIA)	Bacteriological, Chlorine, pH
720	JET ENGINE TEST CELL	Bacteriological, Chlorine, pH
2100	*SANDIA E SCHOOL*	Bacteriological, Chlorine, pH, Fluoride
28051	GOLF COURSE	Bacteriological, Chlorine, pH
975	58 SOW Training Building	Bacteriological, Chlorine, pH
20604	377 ABW/HQ	Bacteriological, Chlorine, pH
803	803 ASPEN STREET	Bacteriological, Chlorine, pH
20160	*EAST CDC*	Bacteriological, Chlorine, pH, Fluoride
20797	TRESTLE	Bacteriological, Chlorine, pH
57001	NMERI	Bacteriological, Chlorine, pH
1914	*WEST CDC (MAXWELL)*	Bacteriological, Chlorine, pH, Fluoride
419	AFRL LIBRARY	Bacteriological, Chlorine, pH
4033B	4033B Mercury Drive	Bacteriological, Chlorine, pH
20226	SANDIA CREST CLUB	Bacteriological, Chlorine, pH
25000	*WHERRY SCHOOL*	Bacteriological, Chlorine, pH, Fluoride
29200	ITRI (LOVELACE)	Bacteriological, Chlorine, pH
24270	1291 HILL DRIVE	Bacteriological, Chlorine, pH
1018	542 AMS/FL	Bacteriological, Chlorine, pH
20350	*THUNDER BIRD INN (AC WATERING POINT)*	Bacteriological, Chlorine, pH
800	SNL/NM TECH AREA I	Bacteriological, Chlorine, pH
6587	SNL/NM TECH AREA III	Bacteriological, Chlorine, pH
861	SNL/NM CAFETERIA	Bacteriological, Chlorine, pH
980	SNL/NM TECH AREA IV	Bacteriological, Chlorine, pH
1914	WEST CDC (MAXWELL HOUSING)	Bacteriological, Chlorine, pH

4.1.3. When requested by Public Health (377 AMDS/SGPM), 377 AMDS/SGPB will perform bacteriological and chemical analysis on ice samples.

4.1.4. Bacteriological analysis and chlorine levels of temporary drinking water containers such as water buffaloes and water bladders will be checked initially by 377 CES/CEOUW before use and

the chlorine levels checked daily thereafter. During extremely hot weather the chlorine levels should be checked several times a day. Bacteriological samples should be collected by 377 AMDS/SGPB at least once a week while the water buffaloes are in operation.

4.1.5. The Thunderbird Inn, building 20350, is the designated aircraft watering point. Total coliform, chlorine and pH samples are collected from the aircraft watering point on a monthly basis by 377 AMDS/SGPB. Members of the 377 AMDS/SGPB will conduct a sanitary survey of the aircraft watering point annually. The purpose of the survey is to evaluate the adequacy of the drinking water source and to determine the water point's capacities to provide potable water that meets federal and state regulations.

4.1.6. Well Sampling and Analysis: The drinking water system on Kirtland AFB consists of 9 potable drinking water wells. The 377 AMDS/SGPB performs sampling of all wells by monitoring entry points to the distribution system as required by NMED Title 20, Chapter 7, Part 1. Currently, six points meet the criteria for entry points. The six entry points represent all 9 wells after treatment (treatment at Kirtland AFB only consists of chlorination)

4.1.6.1. A state-certified contract laboratory will analyze all samples. Funding for the contract is received through environmental compliance program dollars. 377 AMDS/SGPB will report sample results to the appropriate state agencies and will provide courtesy copies of sampling results to 377 CES/CEOIW and Environmental Management (377 ABW/EM). 377 AMDS/SGPB will maintain sampling documentation files.

4.1.6.2. If a new source (well) is brought on line or an inactive source is brought back on-line, source sampling must be conducted by 377 AMDS/SGPB within 90 days until baseline has been established. Baseline sampling is considered to consist of sampling for four quarters for Volatile Organic Compounds (VOC) and Synthetic Organic Compounds (SOC), one quarter for Inorganic Compounds (IOC), nitrate and nitrite, and radionuclides constitutes a baseline year. Entry point sampling may continue as usual during this time. Tap sampling (i.e., asbestos, total coliform, and Pb and Cu) is not affected by a new or reactivated source. In the case of Total Tri-Halomethanes (TTHM), any changes to the treatment program preclude reduced sampling.

4.1.6.3. Refer to table 4-2 for the analysis and sample frequency required by New Mexico Environment Department Drinking Water Regulations.

Table 4-2. Kirtland AFB Drinking Water Samples.

Analysis	Frequency	Next Sampling Event
Asbestos	1 Sample Every 9 Years	CY 2002
Inorganic Chemicals (IOC)	Triennial	CY 2002
Volatile Organic Compounds (VOCs)	Triennial	CY 2002
Synthetic Organic Compounds (SOCs)	2 Consecutive Quarterly Samples Every 3 Years	CY 2002
Nitrates/Nitrites	Annual	CY 2001
Radionuclides (Naturally Occurring)	Once Every 4 Years	CY 2004
Unregulated VOCs	Once Every 5 Years	CY 2005
Total Trihalomethanes (TTHMs)	1 Sample per Quarter	CY 2001

4.1.7. Asbestos (NMED Title 20, Chapter 7, Part 1, Subpart III, Section 304. A and B) sampling is performed by 377 AMDS/SGPB once during the first 3 year compliance period on each 9 year compliance cycle. The drinking water system is vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe. As such, the system is required to take one sample from a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur. The distribution system in Zia Park housing contains asbestos-cement pipe and 1851 Perimeter Circle will serve as the sampling location.

4.1.8. Inorganic Chemicals (NMED Title 20, Chapter 7, Part 1, Subpart III, Section 304. A and C) samples shall be collected by 377 AMDS/SGPB once every 3 years at each entry point to the distribution system after treatment has taken place. Chemical analysis will include: antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium.

4.1.9. Volatile Organic Compounds (NMED Title 20, chapter 7, part 1, subpart III, Section 305) samples will be collected by 377 AMDS/SGPB once every 3 years at each entry point to the distribution system after treatment has taken place. Chemical analysis will include Phase II/IIB and V listed VOCs.

4.1.10. Synthetic Organic Compounds (NMED Title 20, chapter 7, part 1, subpart III, Section 305) samples will be collected by 377 AMDS/SGPB during two consecutive quarters once every 3 years at each entry point to the distribution system after treatment has taken place. Chemical analysis will include Phase II/IIB and V listed SOCs.

4.1.11. Nitrates/Nitrites (NMED Title 20, chapter 7, part 1, subpart III, section 304. A, D and E) samples shall be collected annually by 377 AMDS/SGPB from each entry point to the distribution system after treatment has taken place. Samples will be collected during the quarter which previously resulted in the highest analytical result (use CY99 nitrate results for highest quarter determination).

4.1.12. Radionuclide (NMED Title 20, chapter 7, part 1, subpart III, section 306 and 307) sampling is required quarterly for 1 full year once every 4 years. Samples are collected by 377 AMDS/SGPB from each entry point to the distribution system after treatment has taken place.

4.1.13. Unregulated VOCs (NMED Title 20, chapter 7, part 1, subpart III, section 701) samples are collected by 377 AMDS/SGPB from each entry point to the distribution system after treatment has taken place. Samples are required once every 5 years.

4.1.14. Total Trihalomethanes (TTHMs) (NMED Title 20, chapter 7, part 1, subpart III, Section 313) samples are required from four locations. One sample will be collected by 377 AMDS/SGPB from one location each quarter. Those locations are building 29200 (ITRI), 7312 Hirsch Ave (Zia Park Housing), building 2100 (Sandia Elementary School), building 592 (Bioenvironmental Engineering). The IRTI building represents the maximum residence time and the other 3 locations represent the typical residence time.

4.1.15. Lead and Copper Rule (rule 62-551 F. A. C.) samples are the first draw sample that has remained motionless in the plumbing system of each sampling site for at least six hours. From residential housing the sample is taken from the cold water kitchen tap or bathroom sink tap. From nonresidential buildings the sample is collected at an interior tap from which water is typically drawn for consumption. The purpose of the sampling is to determine if the water supply is having a corrosive effect on plumbing systems. Initially, 60 sites were sampled twice in the first year (92/93). Results from these sampling events indicated Kirtland AFB was in compliance and sampling was reduced to once a year versus two consecutive 6 month periods. Because lead and copper concentrations in samples collected in 1994, 1995 and 1996 were below action levels, monitoring was reduced further to once every 3 years. Lead and copper sampling is conducted by 377 AMDS/SGPB at the locations (all sites are residential) included in table 4-3.

Table 4-3. Lead and Copper Sample Locations.

Location	Location
1615 Perimeter Circle	7520 Fairchild Ave
1624 Perimeter Circle	7461 Darling Ave
7560 Darling Avenue	1750 Perimeter Circle
2180 Hirsch Ave	7481 Ellis Ave SE
1821 San Pablo St SE	7221 Ridgecrest Ave
7380 Ellis Ave SE	1845 Perimeter Circle
1700 San Pablo St	7560 Bradshaw Ave
2081 San Pablo St	7680 Anthis Ave
1782 Perimeter Circle	1818 Perimeter Cir
7540 Conner St	7461 Fairchild Ave
7420 Gerris Ave	7421 Ridgecrest Ave
7660 Gerris Ave	7501 Ellis Ave
7381 Bradshaw Ave	7580 Gerris Ave
1581 Walker St	1635 Perimeter Cir
7311 Ellis Ave SE	1767 Perimeter Cir SE

4.1.16. Back Flow Prevention Program: 377 AMDS/SGPB personnel will provide technical support for this program as required. 377 AMDS/SGPB personnel involved with this program will be knowledgeable in the classification of back-flow devices, the installation and location of these devices, and understand the testing program. 377 CES will identify back-flow prevention devices to 377 AMDS/SGPB. 377 AMDS/SGPB will classify each device based on the degree of hazard the device is protecting the water supply from. 377 CES/CC is responsible for maintenance of the program.

4.1.17. Water Main Breaks: 377 CES/CEOID will notify 377 AMDS/SGPB whenever there is a water main break or loss of pressure. After 377 CES/CEOID performs super-chlorination according to the American Water Works Association standards, 377 AMDS/SGPB will collect bacteriological water samples down stream of the activity to ensure water quality has not been affected. 377 CES will ensure super-chlorination and bacteriological water testing are performed as part of any large-scale water system modification or new facility construction. Funding for these samples fall under environmental compliance dollars.

5. Clean Water Act:

5.1. Storm Water Monitoring: 377 ABW/EM will arrange and fund for a contractor to take samples quarterly from 5 sample locations. The contractor must perform sampling according to National Pollutant Discharge Elimination System (NPDES) Multi-Sector Storm Water General Permit requirements. They will report results to NMED and 377 ABW/EM will maintain the files. The contractor will also provide copies of the reports to 377 AMDS/SGPB.

5.2. Sanitary Sewer System Monitoring. Wastewater from KAFB is disposed as sanitary sewer effluent. The base does not operate any point-source discharges regulated by the National Pollutant Discharge Elimination System (NPDES) for discharge of treated sanitary sewer effluent. Sanitary wastewater includes effluents from base laboratories, aircraft maintenance facilities, production operations, as well as discharges from base restrooms and personnel housing.

5.2.1. The base sanitary sewer network collects sanitary wastewater that connects to the city of Albuquerque sewer system. 377 ABW/EM contracts for sanitary effluent disposal to the city of Albuquerque's Publicly Owned Treatment Works (POTW). 377 ABW/EM maintains four industrial out-fall permits with the POTW that require the base to monitor effluent for regulated metals and organic parameters. City of Albuquerque personnel collect quarterly monitoring data from each of the permitted out-falls. 377 ABW/EM provides monitoring data and other information specified in the permit requirements to the City in semiannual reports. The city of Albuquerque Public Works Department Sewer Use and Wastewater Control Ordinance contains enforceable wastewater discharge limitations that regulate discharges to the POTW. These limitations include pH, temperature, and concentrations of various organic and inorganic compounds. KAFB facilities that discharge to the offsite POTW are subjected to the pretreatment permits issued by the city of Albuquerque.

6. Resource Conservation and Recovery Act (RCRA): The Kirtland AFB Hazardous Waste Management Plan defines waste characterization, annual sampling of waste oil collection points, and oil/water separator sampling. 377 ABW/EM is responsible for developing and maintaining Hazardous Waste Management Plan according to AFI 32-7042, *Solid and Hazardous Waste Compliance*. A contract laboratory determined by 377 ABW/EM will collect and analyze samples. 377 ABW/EM maintains sampling documentation and provides an annual summary to 377 AMDS/SGPB. 377 ABW/EM conducts all compliance reporting and funding programming.

6.1. Waste Streams: Reference KAFB Hazardous Waste Management Plan, appendix C, for listing of satellite accumulation points, waste accumulation points, 90-day accumulation points, and sample protocols.

7. Asbestos Control Program (ACP): An initial base wide survey has been accomplished by 377 CES and is on file at 377 ABW/EM. 377 ABW/EM conducts bulk sampling of suspected asbestos-containing materials. A contract laboratory certified to perform asbestos bulk sample analysis analyzes all samples. Air monitoring of asbestos abatement operations, other than air monitoring conducted by the Base Asbestos Abatement Team (BAAT), is accomplished by the abatement contractor as part of the asbestos abatement project contract. 377 CES conducts periodic air sampling required by BAAT operations with analysis performed at a laboratory determined by 377 AMDS/SGPB. 377 CES/CEV maintains all bulk sampling and abatement data in the master asbestos information repository. 377 AMDS/SGPB maintains air-sampling data for BAAT operations in appropriate case files. 377 AMDS/SGPB will perform periodic assessment of existing ACM to ensure no uncontrolled occupant/worker exposures according to AFOSH Std 48-8, *Controlling Exposures to Hazardous Materials*, attachment 9.

8. Lead-Based Paint (LBP) Program: A comprehensive investigation of priority facilities has been conducted for buildings sited on Kirtland AFB. Priority sites have been abated and records of these investigations and abatement activities are on file with 377 ABW/EM.

8.1. 377 AMDS/SGPB will accomplish lead sampling for all Lead Toxicity Investigations (LTI) that are required by elevated blood levels detected in the well-baby screening program. 377 AMDS/SGPB will maintain all LTI documentation and sample results. 377 ABW/EM will maintain all lead sampling data, excluding LTI, in the master LBP information repository.

8.2. Periodic reinspections will be incorporated into routine facility inspections conducted by the Lead-Based Paint Operations Officer, 377 AMDS/SGPB and 377 CES trained personnel. The routine reinspections will be performed and prioritized based on the initial health risk assessment. These inspections are important to monitor paint conditions and to correct hazards as they develop.

9. Toxic Substance Control Act (TSCA): Chemicals which require reporting under TSCA are not stored at Kirtland AFB and no routine sampling is required. Occasionally equipment suspected of containing Polychlorinated Biphenyls (PCB) is removed from service by the user and PCB sampling is performed at that time. A contractor funded by 377 ABW/EM will perform sampling. 377 AMDS/SGPB maintains copies of sample results and 377 ABW/EM will maintain the originals.

10. Clean Air Act: Kirtland Air Force Base (AFB) is located in Albuquerque, New Mexico in the county of Bernalillo on approximately 52,000 acres. This region has been designated as "in maintenance status" for carbon monoxide and in attainment for all the other criteria pollutants. The regulatory agency responsible for air pollution is the Albuquerque-Bernalillo County Air Quality Control Board. Kirtland AFB is a major source as defined by the Albuquerque Environmental Health Department Title 20, chapter 11, part 42 Air Quality Control Regulations and a synthetic minor source for hazardous air pollutants (HAP) under Title III of the Clean Air Act Amendments of 1990. Since Kirtland AFB is defined as a major source, a Title V permit application was submitted on 28 Dec 1995 in accordance with Albuquerque Environmental Health department title 20, chapter 11, part 41. 377 ABW/EM will execute all compliance reporting and funding programming.

11. Installation Restoration Program (IRP): A contractor under the guidance of the 377 ABW/EM Installation Restoration Program Manager performs all sampling. No long-term sampling by BES is currently required.

12. Recreational Water: Kirtland AFB has 3 swimming pools and two hot tubs. One swimming pool is near the Mountain View Club, another is behind the Coronado Club and the third is adjacent to the east fitness center. One in-ground hot tub is located in the east fitness center and one above-ground hot tub is located in the west fitness center.

12.1. 377 AMDS/SGPB will perform preseason and postseason surveys of the swimming pools according to AFOSH Std 48-14, *Swimming Pools, Spas and Hot Tubs, and Bathing Areas*. During the preseason survey, 377 AMDS/SGPB must collect bacteriological sampling for Heterotrophic Plate Count (HPC) and fecal coliform samples within 72 hours of pool opening. The indoor pool (which remains open year round) will receive a “preseason” survey when the two outdoor pools receive theirs. Post season survey of the indoor pool is not necessary. These requirements are IAW AFOSH Std 48-14, 2.1.4.4 through 2.1.5.5.

12.2. 377 AMDS/SGPB will perform biweekly inspections of the outdoor pools to ensure water quality and sanitary conditions meet Center for Disease Control guidelines during pool season , usually from Memorial Day to Labor Day. They perform inspections monthly at the indoor pool when the

outdoor pools are closed and biweekly when the outdoor pools are open. Rationale for inspection frequencies is based on past performance history.

12.3. One hot tub is located in the east fitness center and another is located in the west fitness center. 377AMDS/SGPB will monitor the hot tubs according to AFOSH Std 48-14. CES personnel will maintain the hot tub located in the east fitness center. The hot tub in the west fitness center is still under warranty and as such is maintained by the contractor who installed the hot tub. 377 AMDS/SGPB shall measure pH, temperature, and disinfectant residual level monthly during times of heavy use IAW AFOSH Std 48-14, 2.2.4.3.

12.4. Routine bacteriological sampling of pools, spas and hot tubs is neither economical nor necessary. Bacteriological sampling is recommended in instances of illness outbreaks. The use of certified laboratories for bacteriological analyses is not required if 377 AMDS/SGPB adheres to *Standard Methods for the Examination for Water and Wastewater*.

12.5. 377 AMDS/SGPB must use Program Element Code 87705, Military Public/Occupational Health to fund 377 AMDS/SGPB activities conducted to ensure compliance with AFOSH Std 48-14. Activities associated with AFOSH Std 48-14 are not eligible for environmental compliance funding.

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